

**EPA Superfund
Record of Decision:**

**PADUCAH GASEOUS DIFFUSION PLANT (USDOE)
EPA ID: KY8890008982
OU 12
PADUCAH, KY
09/29/1997**

DOE/OR/06-1567&D1

**Record of Decision for Waste Area Group 17
at the Paducah Gaseous Diffusion Plant,
Paducah, Kentucky**

September 1997

CERTIFICATION

Document Identification: Record of Decision for Waste Area Group 17 at the
Paducah Gaseous Diffusion Plant, Paducah, Kentucky,
DOE/OR/06-1567&D1

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

The Department of Energy has signed as "owner and operator" and Lockheed Martin Energy Systems, Inc., has signed as "co-operator" this application for the permitted facility. The Department has determined that dual signatures best reflect the actual apportionment of responsibility under which the Department's RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions, as well as general oversight, and the contractor's RCRA responsibilities are for day-to-day operations (in accordance with general directions given by the Department of Energy as part of its general oversight responsibility), including but not limited to, the following responsibilities: waste analyses and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification required by 40 CFR Section 270.11(d), the Department of Energy's representatives certify, to the best of their knowledge and belief, the truth accuracy and completeness of the application for their respective areas of responsibility.

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Record of Decision for Waste Area Group 17
at the Paducah Gaseous Diffusion Plant,
Paducah, Kentucky

September 1997

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Prepared for
United States Department of Energy
Remediation Management Group

PREFACE

This record of Decision for Waste Area Group 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/06-1567&D1, was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation, and Liability Act, the Resource Conservation and Recovery Act, and the Kentucky Revised Statutes Chapter 224, subchapter 46. This work was performed under Work Breakdown Structure 7.1.09.07.03.08 (Activity Data Sheet 5309). This document follows the outline for records of decision contained in the draft Federal Facility Agreement and the Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment, EPA/540/G-89/007. Publication of this document meets a primary document deliverable milestone for the United States Department of Energy's Remediation Management Group at the Paducah Gaseous Diffusion Plant. This document provides the record of information and rationale that the United States Environmental Protection Agency, the Kentucky Department for Environmental Protection, and the DOE utilized in the selection of no further action at Waste Area Group 17.

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ACRONYMS AND ABBREVIATIONS

The following list of acronyms and abbreviations is provided to assist in the review of this document.

ACO	Administrative Order by Consent
AOC	area of concern
BCWMA	Ballard County Wildlife Management Area
C.F.R.	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
cm	centimeter(s)
cm 2	square centimeters
COC	chemical of concern
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
CSOU	comprehensive site operable unit
cpm	counts per minute
DOE	United States Department of Energy
dpm	disintegrations per minute
ELCR	excess lifetime cancer risk
EPA	United States Environmental Protection Agency
ft	foot (feet)
ft 3	cubic foot (feet)
FFA	Federal Facility Agreement
gal	gallon
HSWA	Hazardous and Solid Waste Amendments
K.R.S.	Kentucky Revised Statutes
KDEP	Kentucky Department for Environmental Protection
km	kilometer(s)
KOW	Kentucky Ordnance Works
KPDES	Kentucky Pollutant Discharge Elimination System
l	liter
m	meter(s)
m 3	cubic meter(s)
mgd	million gallons per day
NaI	sodium iodide
OU	operable unit
PCB	polychlorinated biphenyl
pCi/g	picocurie per gram
PGDP	Paducah Gaseous Diffusion Plant
ppm	parts per million
PRAP	proposed remedial action plan
RCRA	Resource Conservation and Recovery Act
ROD	record of decision
SARA	Superfund Amendments and Reauthorization Act of 1986
TVA	Tennessee Valley Authority
USEC	United States Enrichment Corporation
WAG	waste area group
WKWMA	Western Kentucky Wildlife Management Area
yd 3	cubic yard(s)

PART 1

**DECLARATION FOR THE RECORD OF DECISION FOR
WASTE AREA GROUP 17**

SITE NAME AND LOCATION

Waste Area Group 17
Paducah Gaseous Diffusion Plant
United States Department of Energy
Paducah, Kentucky

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for Waste Area Group (WAG) 17 at the Paducah Gaseous Diffusion Plant (PGDP) near Paducah, Kentucky. The remedy outlined in this document was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, the National Oil and Hazardous Substances Pollution Contingency Plan, and the Kentucky Revised Statutes (K.R.S.) Chapter 224, subchapter 46. This decision is based on the administrative record for this site.

With participation from the Kentucky Department for Environmental Protection (KDEP), both the United States Environmental Protection Agency (EPA) and the United States Department of Energy (DOE) entered into an Administrative Order by Consent (ACO) effective November 23, 1988. The ACO was drafted pursuant to Sections 104 and 106 of CERCLA, which provide authority for conducting remedial actions in response to releases of hazardous substances, pollutants, or contaminants. The PGDP was placed on the CERCLA's National Priorities List May 3 1994 (effective date June 30, 1994).

The DOE was issued a Kentucky Hazardous Waste Management Permit and an EPA Hazardous and Solid Waste Amendments of 1984 (HSWA) permit July 16, 1991. The KDEP portion of the Resource Conservation and Recovery Act (RCRA) permit was issued pursuant to Chapter 224 of the K.R.S. by authority granted from the EPA to the KDEP. The EPA issued its portion of the RCRA permit pursuant to the HSWA. The RCRA permits require the proper treatment, storage, and disposal of waste; corrective action (i.e., cleanup), closure of regulated units; and investigation of off-site contamination. The DOE is currently negotiating a Federal Facility Agreement (FFA) with the EPA and the KDEP to integrate the overlapping requirements of the CERCLA and the RCRA that apply to the PGDP. A draft of this FFA has been made available for public comment and the parties are now engaged in finalizing the agreement in light of comments submitted to them.

The EPA and the KDEP have participated in the development of this record of decision (ROD), including review and comment on the content of the document. The DOE and the EPA, with the concurrence of KDEP and the Commonwealth of Kentucky's Cabinet for Health Services Radiation Control Branch, have selected no further action for WAG 17.

DESCRIPTION OF SELECTED REMEDY: NO FURTHER ACTION

Waste Area Group 17 consists of 37 areas of concern (AOCs) that were identified as suspected sources of off-site contamination in the Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1207&D3; therefore, a remedial investigation was conducted. Based on the results of the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, the DOE selected no further action as the remedy for 28 of the 37 WAG 17 AOCs. The 28 AOCs that are selected for no further action are 103, 104, 110, 111, 112, 114, 115, 116, 117, 118, 119, 120, 121, 123, 124, 125, 126, 127, 128, 146, 147, 148, 149, 150, 151, 152, 184, and 197. The remaining nine AOCs will be transferred to WAG 25 (i.e., AOCs 93, 105, 106, 107, 108, 109, 113, and 175) and WAG 18 (i.e., AOC 129). The process that led the DOE to a no further action decision is consistent with the cleanup strategy for the PGDP, as outlined in the Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky,

DOE/OR/07-1207&D3. The Kentucky Hazardous Waste Management Permit (KY8-890-008-982) will be modified upon signature of this ROD by designating the previously mentioned 28 of the 37 AOCs of WAG 17 as no further action and including them in Appendix A-2 (Table A-5) of the permit. The remaining nine AOCs will be transferred into the listings for WAG 18 and WAG 25.

DECLARATION STATEMENT

The DOE, under federal authority, has eliminated a potential risk posed by WAG 17 by remediating AOC 124 through a removal action. The removal action began in July 1996 and was completed April 15, 1997.

Metals (e.g., lead) were detected at elevated concentrations in one sample at AOC 127; however, they will not be addressed under the DOE's Remediation Management Group. Area of Concern 127 is located on Western Kentucky Wildlife Management Area property. The detected metal concentrations are believed to originate from illegally dumped trash in the area and not from the PGDP. The EPA and the KDEP agree that the elevated metals detected did not originate from the WAG 17 concrete rubble or the PGDP. Consequently, AOC 127 is included in the no further action remedy.

No remedial action is necessary for protection of human health and the environment at WAG 17, and the CERCLA requirements are not triggered. Consequently, there is no need to evaluate the nine CERCLA criteria.

Under the no further action scenario, no additional action will occur at the WAG 17 AOCs. Also, no institutional controls or engineering controls will be implemented and there are no costs associated with implementing the no further action decision. This remedy will not result in hazardous substances remaining onsite above health-based levels; therefore, the five-year review requirement will not apply to WAG 17.

PART 2

DECISION SUMMARY

2.1 Site Name, Location, and Description

The Paducah Gaseous Diffusion Plant (PGDP), located in western Kentucky, is an operating uranium enrichment facility owned by the United States Department of Energy (DOE) (Figure 2-1). The DOE Leased the plant production facilities to the United States Enrichment Corporation (USEC) July 1, 1993. The USEC contracts with Lockheed Martin Utility Services, Inc., to provide operation and maintenance services. Lockheed Martin Energy Systems, Inc., provides environmental restoration and waste management services for the PGDP under the DOE's Environmental Management Program.

The 28 areas of concern (AOCs) addressed in this record of decision (ROD) consist of concrete rubble and the surrounding soil. The concrete rubble is believed to have originated from the PGDP where it may have served as roadways, sidewalks, curbing, buildings, transmission tower bases, cylinder supports, and construction rubble. Most of the concrete material at the WAG 17 AOCs is currently used for a number of purposes, including bank and erosion control, dam and structural support, and roadway stabilization. However, some of the materials are simply isolated rubble piles. The WAG 17 AOCs are accessible to the public and have been classified as nonsecure. The AOCs are located within the boundaries of the DOE reservation, the Tennessee Valley Authority (TVA) Shawnee Steam Plant reservation, the Western Kentucky Wildlife Management Area (WKWMA), the Ballard County Wildlife Management Area (BCWMA), and on private property immediately west of the DOE reservation (Figure 2-1).

2.2 Site History and Enforcement Activities

This section presents descriptions of the 28 AOCs of WAG 17, which are separated into groups based on the purpose of the rubble piles. The information provided in this section was derived

from the PGDP Environmental Restoration Health Physics Special Purpose/Routine Radiological Survey Results (Survey No. 92-SP-317-S); the Preliminary Radiological Characterization of Ogden Landing Road Concrete Rubble Site, IT/NS-80-131; and the Results of the Site Investigation, Phase II, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, KY/SUB/13B-97777C P-03/1991/1. This section also identifies any prior enforcement activities that have occurred at the 28 AOCs in this ROD. Map locations of the AOCs are presented in Figures 2-1 and 2-2.

The results of the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, are described in Section 2.6.3 of this ROD.

2.2.1 Bank Control and Erosion Control Grouping

Concrete material at AOCs 115, 116, 118, 127, 149, and 151 serves as bank and erosion control along bodies of water. The following information provides further details of the AOCs in this grouping.

- Area of Concern 115 is located in the TVA reservation along Little Bayou Creek and the Slough Dam, 305 m (1,000 ft) west of the old TVA ash disposal area. The material at this site is composed of concrete slabs, rubble with some steel, and conduit pipes, most of which appears to have originated from TVA activities. This material was placed on the southwest bank of Little Bayou Creek for bank support, channeling (for transport of the TVA ash-transport water), and also to serve as a levee for the "wetlands" slough. The approximate volume of rubble material is 764.1 m³ (1,000 yd³). Beta and gamma screenings at this AOC revealed no radiation above background levels.
- Area of Concern 116 is located in the TVA reservation on the north bank of Bayou Creek. The material at this site is composed of concrete rubble that was probably generated during PGDP road upgrades. The concrete is being used in an attempt to halt erosion at a minor tributary run-off ravine entering the creek. The approximate volume of the rubble is 22.9 m³ (30 yd³). Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 118 is located in the WKWMA at the Bayou Creek sampling station where West Boone Road meets Bayou Creek. The material at this site is composed of concrete rubble and slabs that likely originated from PGDP road construction. The concrete was placed on the bank above and below the sampling station to control erosion. The approximate volume of the concrete is 15.3 m³ (20 yd³). Radiation screening of the rubble found one slab of concrete with beta and gamma readings slightly above background levels. The slab was marked in the field with red paint.
- Area of Concern 127 is located in the WKWMA at a culvert on Gravel Pit Road, approximately 160 m (528 ft) north of Heath-Woodville Road. The material at this site includes concrete slabs that are believed to have originated from the PGDP. The concrete was used to control erosion at this culvert. The volume of the concrete is approximately 7.6 m³ (10 yd³). Beta and gamma screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 149 is located within the BCWMA on a dam face at the west end of Happy Hollow Lake. The material at this site is composed of concrete slabs. The origin of this material is unknown. The concrete is used for erosion control on the dam face. The volume of concrete at the dam is approximately 11.5 m³ (15 yd³). Beta and gamma radiation screening revealed no radiation above background levels.

- Area of Concern 151 is located within the BCWMA at the dam on the west end of Mitchell Lake. The material at this site is composed of concrete slabs and rubble. The amount of concrete, if any, derived from the PGDP is unknown. The concrete is currently used to control erosion on the face of the dam. The total volume of the structure is approximately 2,292.5 m³ (3,000 yd³), of which an unknown amount is concrete rubble. Beta and gamma radiation screening revealed no radiation above background levels.

2.2.2 Dam and Structural Support Grouping

Concrete material at AOCs 103, 104, 112, 146, 147, and 150 currently is associated with dam construction and provides structural support. The following information provides further details of the AOCs in this grouping.

- Area of Concern 103 is located south of the DOE reservation boundary near the intersection of the PGDP entrance highway and Dykes Road. The material at this site is composed of concrete, soil, and gravel spoils from the construction of a cylinder storage yard south of the C-333 Process Building. It was used to construct a dam and create a fish pond in the WKWMA. The total volume of the dam is approximately 1,911.3 m³ (2,500 yd³) with concrete visible only at the northwest corner of the structure. Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 104 is located in the WKWMA at the south end of the fish pond referred to in the description of AOC 103. The material at this site consists of concrete spoils from an unknown source that is used as part of a levee for the pond. The volume of concrete is not known. Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 112 is located within the WKWMA at a dam on a second fish pond north of the DOE reservation. The AOC is composed of concrete slabs that partially originate from the PGDP road upgrades. The dam appears to be built of soil from the pond area with gravel and concrete rubble added for stability. The volume of concrete cannot be determined accurately due to the sporadic distribution of the concrete rubble and because it is nearly all underwater. Beta and gamma radiation screenings of the concrete above water showed no radiation above background levels.
- Area of Concern 146 is located in the BCWMA approximately 17.7 km (11 miles) west of the PGDP where a roadway crosses over a dam on Shelby Lake. The BCWMA headquarters are situated approximately 305 m (1,000 ft) to the east of the AOC. The material at this location is composed of concrete rubble with an unknown portion possibly originating from the PGDP. The concrete was used in construction of the dam and currently supports the dam face. The approximate volume of concrete at this AOC is 1,528.2 m³ (2,000 yd³). Elevated levels of beta radiation were measured during the screening at AOC 146. Alpha radiation scanning was also conducted, but no radiation above background levels was detected. The elevated beta radiation levels ranged from 12,000 to 70,000 disintegrations per minute (dpm)/100 cm². Areas with elevated radiation levels were smear tested in the field for transferable contamination, but none was detected.
- Area of Concern 147 is located within the BCWMA at Butler Lake Dam, which is located on the west end of Butler Lake. The dam is used to control the lake level and provide a roadway. The material at this site is composed of concrete rubble, which likely originates from various sources, including the PGDP. The concrete was used in construction of the dam and now supports the dam face. The volume of the dam is approximately 1,529 m³ (2,000 yd³), with concrete rubble making up an indeterminate amount. Beta and gamma radiation screening of the concrete revealed no radiation above background levels at this AOC.

- Area of Concern 150 is located within the BCWMA at a dam on the west end of Caster Lake. The dam controls the lake level and provides part of a roadway. The material at this site is composed of concrete rubble with an unknown quantity, if any, originating from the PGDP. The concrete rubble was used to construct the dam and control erosion on the dam's face. The volume of the dam is approximately 2,293.5 m³ (3,000 yd³), of which an unknown fraction is concrete rubble. Beta and gamma radiation screening of the concrete at this unit revealed no radiation above background levels.

2.2.3 Bridge Support and Erosion Control Grouping

Concrete material at AOCs 114, 117, 119, 120, 121, and 128 is used for support and erosion control at bridges and culverts in WAG 17. The following information provides further details of the AOCs in this grouping.

- Area of Concern 114 is located on the TVA reservation north of the WKWMA boundary. The AOC is composed of concrete rubble from a PGDP source. The rubble is used for support and erosion control at a culvert bridge that crosses a small tributary of Little Bayou Creek. The approximate volume of concrete at this location is 30.6 m³ (40 yd³). Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 117 is located in the western part of the TVA reservation where a bridge crosses Bayou Creek. The material at this site consists of concrete rubble from a PGDP source. The rubble is used to control erosion around the bridge and to support the nearby creek bank. The approximate volume of concrete at this location is 11.5 m³ (15 yd³). Beta and gamma screening of the concrete rubble found one piece with a reading of 90 cpm above background levels. The remainder of the concrete rubble had no radiation above background levels.
- Area of Concern 119 is located within the WKWMA outside the western boundary of the DOE reservation where a steel bridge crosses Bayou Creek. The material at this site appears to be demolished sidewalks that most likely originated from the PGDP. The concrete slabs have been placed along the creek banks underneath, upstream, and downstream of the bridge for erosion control. The approximate volume of concrete is 3.8 m³ (5 yd³). Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 120 is located on the DOE reservation at the north end of the C-611-Y Lagoon for the C-611 Water Treatment Plant. Specifically, the area involves the effluent ditch and the water line bridge. The material at this site consists of concrete slabs, rubble, and very large blocks [0.1 m³ (4 ft³)] from the PGDP that have been placed under the bridge and along the effluent ditch for erosion control. The approximate volume of the concrete is 7.6 m³ (10 yd³). Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 121 is located on the western edge of the DOE reservation where Rice Springs Road crosses one of the tributaries of Bayou Creek. The concrete rubble at this site is composed of slabs from the PGDP that now are used as an abutment of a condemned bridge. The concrete slabs were also used to construct a ford that replaced the condemned bridge. The approximate volume of concrete is 0.8 m³ (1 yd³). The concrete constituting the ford showed no radiation above background levels.
- Area of Concern 128 is located just inside the southern boundary of the DOE reservation near the crossing of South Acid Road with Bayou Creek. The material at this site consists of concrete slabs, gravel, and soil from a source assumed to be from within the PGDP. The concrete slabs are used for erosion control on creek banks underneath, upstream, and downstream of the bridge. A levee also exists north of the road and east of the creek and is composed of concrete slabs, gravel, and

soil. There is approximately 15.3 m³ (20 yd³) of concrete at the AOC; however, this estimate should be considered a minimum, as it is difficult to estimate the amount of concrete in the levee. Beta, gamma, and alpha radiation screening revealed no radiation above background levels.

2.2.4 Roadway Stabilization Grouping

Concrete material at AOCs 126, 148, and 197 is used to stabilize roadways in the WKWMA and the BCWMA. The following information provides further details of the AOCs in this grouping.

- Area of Concern 126 is located in the WKWMA near the entrance road to the gravel pits. The gravel pits were a source of gravel for the former Kentucky Ordnance Works (KOW), the PGDP, and the WKWMA. Slabs of concrete from an unknown source are visible on both sides of the entrance and may have been used to fill holes along the roadway. The approximate volume of concrete cannot be easily determined, but approximately 0.8 m³ (1 yd³) is visible. Beta and gamma radiation screening of the concrete and gamma radiation screening of the soil revealed no radiation above background levels.
- Area of Concern 148 is located within the BCWMA at the culverts near Burnt Slough, which is approximately 549 m (1,800 ft) south of the Ohio River. The material at this site is composed of concrete block rubble and it is unknown what fraction, if any, of this material is from the PGDP. Concrete block rubble is used at this location to stabilize the edge of the roadway. There appears to be approximately 15.3 m³ (20 yd³) of concrete rubble at this location. Beta and gamma radiation screening of the concrete revealed no radiation above background levels.
- Area of Concern 197 is located on private property north of the PGDP and the WKWMA on Bayou Creek. The concrete rubble serves as a roadbed at a low-water crossing of the creek. The rubble was placed at this location in the late 1980s. The concrete consists of 20 to 25 pieces within a 9.1 m x 15.2 m (30 ft x 50 ft) area. Some concrete pieces are partially submerged in the creek bed and others are located on the eastern bank of the crossing. The approximate total volume of concrete rubble at this AOC is 0.8 m³ (1 yd³). Radiological surveys (alpha, beta, and gamma) of accessible concrete surfaces above the water level of Bayou Creek found no radiation above background levels.

2.2.5 Isolated Rubble Piles Grouping

Areas of Concern 110, 111, 123, 124, 125, 152, and 184 consist of piles of concrete that have no specific purpose. The following information provides further details of the AOCs in this grouping.

- Area of Concern 110 is located approximately 61 m (200 ft) east of the PGDP security area but inside the DOE reservation on an abandoned construction road that once led to the C-337 Process Building. The concrete rubble is stored in piles on both sides of the roadbed and was generated from PGDP road upgrading projects. There is approximately 15.3 m³ (200 yd³) of concrete at this site. Beta and gamma radiation screening found radiation above background levels on expansion joint material that was still attached to various slabs of concrete. The average reading for this material was approximately 150 cpm above background levels. No radiation in the soil was detected above background levels.
- Area of Concern 111 is located inside the plant boundary and lies adjacent to the abandoned access road portion of Ogden Landing Road, which runs east to west through the DOE reservation and north of the PGDP area. The access road is abandoned and traffic use has been restricted by the dumping of concrete construction spoils at the east and west ends of the access road. Some of the concrete is from the PGDP and is in very large pieces that possibly were used as footing material for transmission towers. The approximate volume of the concrete is 1,146.8 m³ (1,500 yd³). A

detailed beta and gamma radiation survey was conducted and surface soil samples taken at this AOC. The radiation survey was conducted on a 6 m (20 ft) grid pattern. Between the east and west areas, 28 grids were surveyed and it was concluded that 13 of the grids showed levels of radiation that exceeded Oak Ridge Operations Radioactive Contamination Control Policy for nonwork surface contamination in a nonradiological area (3,000 dpm/100 cm²). Ten surface soil samples were taken along Ogden Landing Road. The surface soil samples contained concentrations of total uranium well below the reference concentration level of 30 pCi/g of total uranium for unrestricted access to off-site soil.

- Area of Concern 123 is located within the WKWMA, southwest of the PGDP near the intersection of South Acid Road and Rice Springs Road. It is a partially paved area in the former KOW that has received concrete from various PGDP areas and uranium hexafluoride tank supports (cylinder saddles) from the C-745-A Cylinder Yard. Other parties, such as the WKWMA, remove concrete from this site for their use. The volume of concrete at this AOC is approximately 382 m³ to 764 m³ (500 to 1,000 yd³). The beta and gamma radiation screening showed radiation above background levels only on the uranium hexafluoride storage tank supports. These readings ranged from 200 to 500 cpm from isolated areas on the supports. Those areas were marked with red paint.
- Area of Concern 124 is located within the WKWMA, 30.48 to 60.96 m (100 ft to 200 ft) directly south of AOC 123, near the intersection of South Acid Road and Rice Springs Road. The AOC is in an area where sidewalk slabs and other concrete rubble from the KOW and the PGDP have been placed. The approximate volume of concrete at the site is 15.3 m³ (20 yd³). During previous radiation screenings, a contaminated concrete pipe [30.5 cm inside diameter x 122 cm (12 inches inside diameter x 4 ft)] was found on the surface of the AOC. Survey readings from inside the pipe were 45,000 cpm above background levels. The pipe was removed from the site by PGDP personnel. Beta and gamma radiation screening of the concrete slabs and rubble showed no radiation above background levels. However, samples collected during the remedial investigation for WAG 17 indicated elevated levels of radionuclides in the soil. The DOE then performed a removal action during which the soil was excavated, placed in containers, and transported to a secured waste management area at the PGDP.
- The location of AOC 125 is in the WKWMA north of South Acid Road near the intersection of the road and the railroad spur leading to the PGDP. The materials at this site are comprised of rails, roadbed, and crossfies from the KOW and possibly the PGDP. Concrete curbs from parking areas in the PGDP have also been deposited along the road. Approximately 38 m³ (50 yd³) of railroad spoils and approximately 3.8 m³ (5 yd³) of concrete curbing are present at this location. Beta and gamma radiation screening of the concrete rubble found three areas with radiation above background levels. These areas are discrete rusty spots on the concrete, with readings of 2,500 cpm above background levels from one area and 250 cpm above background levels from each of the other two areas. The three areas were marked with red paint. Surveys of the soil found no radiation above background levels.
- Area of Concern 152 is located within the BCWMA near the east end of Mitchell Lake 610 m (2,000 ft) southwest of the curve on Kentucky State Highway 473. The site contains concrete rubble, used brick, and gravel that are being stored for future use at the BCWMA. An unknown fraction of this concrete rubble originates from the PGDP. The volume of waste is approximately 38.2 m³ (50 yd³). Beta and gamma radiation screening of the concrete revealed no radiation above background levels.
- Area of Concern 184 is located within the DOE reservation and south of the C-611 Water Treatment Plant. The AOC is composed of two chunks of concrete from an unknown source. The total volume of concrete is approximately 0.2 m³ (0.2 yd³). Beta and gamma radiation screening of the concrete revealed no radiation above background levels.

2.3 Highlights of Community Participation

A notice of availability was published in The Paducah Sun, a regional newspaper, July 25, 26, and 27, 1997, which announced the beginning of the 45-day public review period for the Proposed Remedial Action Plan for Waste Area Group 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/06-1566&D2. The public comment period began July 26, 1997, and ended September 8, 1997. Specific groups that received individual copies of the proposed remedial action plan included the Natural Resource Trustees and the Site Specific Advisory Board.

2.4 Scope and Role of Operable Unit

The DOE's plan for addressing WAG 17 was to determine if any contamination was present at the AOCs. If contamination was present, the DOE determined whether it exceeded standards set for the protection of human health and the environment. The results of the investigation can be found in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2.

In areas where previous walk-over surveys (i.e., during the site investigation) detected potential radiological contamination above background levels, concrete and soil sampling was performed to define the nature of the radiological activity. Radiation dose readings were also collected in these areas to ensure annual dose limits outlined in the DOE Order 5400.5, Radiation Protection of the Public and the Environment, were not exceeded. In addition to characterization of the sites for radionuclide contamination, samples were also collected to determine if polychlorinated biphenyls (PCBs) and/or metal contamination were present at suspected AOCs. Both of these contaminants are associated with past activities at the PGDP. The sampling ensured a thorough characterization of these AOCs and provided data from which the nature and extent of contamination could be determined.

2.5 Response Action and the Site Management Strategy

The PGDP presents unusually complex problems in terms of hazardous waste management and environmental releases. The DOE's proposed strategy is to divide the site into operable units (OUs) grouped by source areas and comprehensive site operable units (CSOUs) one each for ground water and surface water. Discrete response actions will be selected and implemented for each source area OU, as well as the CSOUs, which are impacted by commingled releases from the source area OUs. Prioritization for investigation and possible remedial action has been assigned to each of the CSOUs (ground water and surface water OUs) and source area OUs depending on their potential for contributing to off-site contamination.

The identification, characterization, and, where necessary, removal of sources of contamination is consistent with the cleanup strategy for the PGDP as outlined in the Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1207&D3.

2.6 Summary of Site Characteristics

The following are descriptions of surface water for the PGDP and individual AOCs since it is the only suspected pathway for contamination movement in WAG 17.

2.6.1 Surface-Water Characteristics of the Paducah Gaseous Diffusion Plant Area

The sources for the following information are the Report of the Paducah Gaseous Diffusion Plant Groundwater Investigation Phase III, KY/E-150, and the Northeast Plume Preliminary Characterization Summary Report, DOE/OR/07-1339&D2.

The PGDP is located in the western portion of the Ohio River Basin (Figure 2-1). A local drainage divide causes the plant's surface water to flow to the east and northeast toward Little Bayou Creek or to the west and northwest toward Bayou Creek. Both Bayou and Little Bayou creeks are perennial streams that discharge into the Ohio River.

Bayou Creek flows northward along the western boundary of the plant from approximately 4 km (2.5 miles) south of the plant to the Ohio River. Little Bayou Creek originates within DOE property and flows northward along the eastern boundary of the plant. Little Bayou Creek joins Bayou Creek in a marsh located approximately 4.8 km (3 miles) north of the PGDP; ultimate discharge is into the Ohio River. Other surface-water bodies located in the area surrounding the PGDP include the Ohio River, Metropolis Lake, Crawford Lake, and numerous small ponds, gravel pits, and settling basins.

At the PGDP, manmade drainage ditches receive storm water and effluent from the plant. These waters are routed through outfalls and eventually discharge into Bayou and Little Bayou creeks. The majority of the flow in these creeks can be attributed to effluent water from the plant. The 18 KPDES-permitted outfalls have a combined average daily flow of 18.5 million l/day (4.88 mgd) and are monitored by the PGDP.

The BCWMA is located in northern Ballard County in the floodplain of the Ohio River (Figure 2-1). Seven oxbow lakes are present in the area, but no creeks. The entire area is inundated by Ohio River flood water on an average of every three years.

2.6.2 Surface-Water Characteristics of Waste Area Group 17

The AOCs within WAG 17 are located within the Ohio River floodplain in the BCWMA and the Bayou Creek watershed (Figure 2-1). Isolated rubble piles outside of the BCWMA are not connected to any water bodies. Rubble piles in the BCWMA are inundated by the Ohio River when large-scale flooding occurs.

2.6.3 Area of Concern Characteristics

The Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, organized the WAG 17 AOCs into three categories for streamlined sampling purposes. Category 1 AOCs are those that demonstrated radiological contamination of concrete or soil during the previous investigations and which, because of PCBs and metals associated with plant activities, were also sampled. Category 2 AOCs have indicated no evidence of radiological contamination of concrete or soil during the previous investigations, but were possibly contaminated with PCBs and metals. Category 3 AOCs indicated no evidence of radiological contamination of concrete or soil, but are located within areas of known radiological and PCB contamination. Category 3 AOCs were not investigated as part of this study and will not be addressed in this ROD (i.e., AOCs 93, 105, and 175 will be transferred to WAG 25 and AOC 129 will be transferred to WAG 18).

The Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, used field screening and analytical laboratory data to determine the nature and extent of contamination of the WAG 17 AOCs. The nature and extent of radionuclides were determined for Category 1 AOCs and the extent of potential PCB and metal contamination was determined for both Category 1 and 2 AOCs.

The AOCs are categorized as follows:

- Category 1 AOCs - 110, 111, 117, 118, 121, 123, 124, 125, 127, and 146; and
- Category 2 AOCs - 103, 104, 112, 114, 115, 116, 119, 120, 126, 128, 147, 148, 149, 150, 151, 152, 184, and 197.

Specific analytical and field methods are explained in detail in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, report. For the purposes of this ROD, beta/gamma refers to radiation detected with open window Geiger-Mueller (pancake) detectors and gamma refers to radiation detected with sodium iodide (NaI) scintillation crystal detectors. The AOCs that pose a potential risk are described in the following text.

2.6.3.1 Category 1 Site Results

The remedial investigation results identified two AOCs (124 and 127) that posed a potential risk to human health and the environment. Area of Concern 124 has since been remediated through a removal action and AOC 127 contamination is believed to have originated from a non-DOE source.

Area of Concern 124.

Historical radiation surveys (i.e., site investigations) identified a concrete pipe with elevated radiation levels at AOC 124. This pipe was removed during initial radiation surveys of the project. No other elevated radiation levels were detected at AOC 124 during the initial investigations; however, the historical survey was focused on the concrete rubble piles and not on the surrounding soils. During the remedial investigation, several metals were detected in the soil at AOC 124 at levels slightly above background concentrations, including arsenic and mercury. Radionuclide contamination, including uranium, was also detected at AOC 124 above background concentrations. After reviewing the data, the DOE initiated a removal action in late July 1996 that is documented in the Action Memorandum for Area of Concern (AOC) 124, Waste Area Group (WAG) 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07 1477&D2. A portion of the soil was excavated, placed in containers, and transported to a secured waste management area at the PGDP. After the area was excavated, soil samples were collected and tested to verify that all contamination had been removed. The data generated from these samples indicated that additional soil needed to be removed. This additional remediation was completed April 15, 1997. By removing detected contamination, the DOE has reduced the risk to an acceptable level at AOC 124.

Area of Concern 127.

Metals (e.g., lead at 539 ppm) were detected in one sample at AOC 127. Area of Concern 127 is located on WKWMA property and the lead detected at this location has been attributed to unauthorized dumping of household trash.

2.6.3.2 Category 2 Site Results

Category 2 sites are those sites for which historical radiation walk-over data indicated no radiological contamination of concrete or soil, but which could be contaminated with PCBs because there is no available evidence to rule out PCB contamination. For this reason, the sampling strategy for Category 2 sites included a visual inspection and PCB soil screening. If the PCB screening results suggested the presence of PCBs at a site, a soil sample was collected and sent for laboratory analysis to confirm the presence of PCBs and identify the specific PCB isomers.

The PCB screening locations are identified on site maps provided in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07 1404&D2. Positive detections were obtained at one of the 28 AOCs in WAG 17 (i.e., AOC 120). All of the detected laboratory PCB analytical results are below 1 ppm, which is the CERCLA and the KDEP screening level for residential land use.

2.7 Summary of Site Risks

Based on the information presented in the baseline risk assessment included in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, no human health risks exist at WAG 17 above acceptable levels as defined by the United States Environmental Protection Agency (EPA). Area of Concern 124 was not included in this assessment due to the removal action that was conducted at this AOC. Minimal ecological concerns were identified at AOCs 121 and 127 during the screening ecological risk assessment. A more thorough evaluation of potential ecological risks will be performed during the sitewide baseline ecological risk assessment to be performed as part of the WAGs 18 and 25 Surface Water Integrator Unit investigation. Metal contamination at AOC 127 is not associated with DOE

activities.

2.7.1 Human Health Risk Assessment

Data from the site investigation and newly collected data were evaluated in the human health risk assessment included in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation for Waste Area Group 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2. To identify chemicals of potential concern (COPCs), all constituents detected in concrete, surrounding soils, and sediments were evaluated using established guidelines. Chemicals of potential concern identified at the WAG 17 AOCs include metals, PCBs, and radionuclides.

The potential for human contact with COPCs found in concrete, soil, and sediment is evaluated in the exposure assessment of the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2. After consideration of all data, the report identifies the most appropriate scenarios for exposure to these media at all AOCs as the recreational user and industrial worker under current conditions, and the recreational user, industrial worker, rural resident, and excavation worker under future conditions.

The toxicity assessment evaluated the toxic characteristics of COPCS in relation to human health based on a review of available scientific evidence. To characterize the potential toxicity of a particular contaminant, this type of effect it can produce and the concentration needed to produce that effect must be known. The contaminants are evaluated as a chemical or radiological hazard. Chemical and radionuclide contaminants are divided into two broad groups according to their effects on human health: contaminants that exhibit carcinogenic effects and contaminants that exhibit noncarcinogenic or systemic effects.

The risk characterization quantified the potential carcinogenic and noncarcinogenic risks for each of the defined exposure pathways for the COPCs. The dose-response characteristics of the contaminants integrated with the exposure intake estimates are used to generate estimates of excess lifetime cancer risk (ELCR) for chemicals or radionuclides and the likelihood of noncarcinogenic effects. From this information, a chemical of concern (COC) list is developed (for the list of COCs and the corresponding risk tables, refer to the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2. The criteria used to define COCs in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2, is based on KDEP guidance that is appropriate for determining baseline risks. To evaluate potential risks at these AOCs, actual exposure times to potential receptors are used as discussed in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2. As noted in the report, when site-specific exposures provided by the WKWMA are used, the resultant risks are well below the KDEP's de minimis level at every AOC. Consequently, no action is required at any AOC to protect human health.

The uncertainties associated with the baseline risk assessment would generally lead to an overestimation of risks at the units. Since all risks are within acceptable limits, the effects of these uncertainties are minimal. For a more complete discussion of the uncertainties associated with baseline risk assessment, refer to the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07 1404&D2.

2.7.2 Ecological Risk Assessment

The screening ecological risk assessment for WAG 17 evaluated chemical and radionuclide contaminants in surface soils and radionuclides in sediments. No ecological risks were found to be associated with radionuclides in stream sediments at any of the AOCs of WAG 17. Two AOCs, 127 and 121, were identified as having potential ecological risks from metals. Chromium, lead, aluminum, and zinc are chemicals of potential ecological concern (COPEC) at AOC 127; however, as

previously discussed, the source of this contamination is not the WAG 17 concrete rubble or the PGDP. At AOC 121, chromium was the only COPEC identified, and it is present just slightly above background levels. These screening risk assessment results indicate that an action is not required at WAG 17 to protect ecological receptors from metal contamination deposited by DOE.

2.8 Description of the No Further Action Alternative

According to EPA guidance [Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment (EPA/540/G-89/007)], if there is no current or potential threat to human health and the environment, then no action is warranted, and the CERCLA requirements for remedial actions are not triggered. Consequently, there is no need to evaluate the nine CERCLA criteria.

Under the no further action scenario, no additional action will occur at the remaining WAG 17 AOCs. No new institutional controls or engineering controls will be implemented and there are no capital, operating, or monitoring expenses associated with implementing the no further action decision.

2.9 Explanation of Significant Changes

The Proposed Remedial Action Plan for Waste Area Group 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/06-1566&D2, was made available for a 45-day public review and comment period that began July 26, 1997, and ended September 8, 1997. A public meeting was held August 26, 1997. The DOE identified no further action for WAG 17. All written and verbal comments submitted during the public comment period were reviewed by the DOE, and it was determined that no significant changes to the remedy were necessary.

PART 3

RESPONSIVENESS SUMMARY

3.1 Responsiveness Summary Introduction

The responsiveness summary has been prepared to meet the requirements of Sections 113(k)(2)(b)(iv) and 117(b) of the CERCLA as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires the DOE as "lead agency" to respond "...to each of the significant comments, criticisms, and new data submitted in written or oral presentation" on the WAG 17 Proposed Remedial Action Plan (PRAP).

The DOE has gathered information on the types and extent of contamination found and recommends no further action. As part of the remedial action process, a notice of availability regarding the PRAP was published in The Paducah Sun, a major regional newspaper of general circulation. The Proposed Remedial Action Plan for Waste Area Group 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/06-1566&D2, was released to the general public July 26, 1997. This document was made available at the DOE's Environmental Information Center in the West Kentucky Technology Park in Kevil, Kentucky, and at the Paducah Public Library. A 45-day public comment period began July 26, 1997, and continued through September 8, 1997. A public meeting was held August 26, 1997, at which time the DOE presented information pertaining to WAG 17 to the public and responded to questions. Specific groups that received individual copies of the WAG 17 PRAP included the Natural Resource Trustees and the Site Specific Advisory Board.

Public participation in the CERCLA process is required by the SARA. Comments received from the public were considered in the selection of the remedial action for the site. The responsiveness summary serves two purposes: to provide the DOE with information about the community preferences and concerns regarding the remedial alternatives and to show members of the community how their comments were incorporated into the decision-making process.

3.2 Community Preferences/Integration of Comments

COMMENT: "On page four of the Proposed Remedial Action Plan for Waste Area Group 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky (DOE/OR/06-1566&D2), it says 'A portion of the soil was excavated, placed in containers, and transported to a secured waste management area at the Paducah Gaseous Diffusion Plant. By removing detected contamination, the Department of Energy has reduced the risk to an acceptable level at Area of Concern 124.' How can that reduce the risk to put it into Waste Management, when Waste Management has been rated as the highest risk at the facility?"

RESPONSE: The text accurately states the risk at Area of Concern (AOQ 124 has been reduced. This AOC is located outside the DOE security fence and could be accessed by the general public. The Department of Energy (DOE) has determined that off-site current and future risk is a priority for cleanup. The soil that was placed in Waste Management is securely stored and monitored in accordance with the appropriate regulations and requirements. The Waste Management facility is listed as a top priority for programmatic planning based on several factors and not risk alone.

COMMENT: "If the agency followed every procedure in the standard operating procedures for determining the 'no further action' finding then it could be justified. However, if any of the procedures for making this determination, such as strictly following all guidance for scanning for radionuclides, are not adhered to, then this determination is questionable."

RESPUNSE: The Department of Energy followed and adhered to the standard operating procedures as referenced in the Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation Report for Waste Area Grouping 17 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1404&D2.

COMMENT: "The commentors continue to believe that a site-wide Environmental Impact Statement (EIS) is required under the National Environmental Policy Act (NEPA). Separating these individual projects without considering the cumulative effects of all projects at the site violates the spirit and letter of the NEPA."

RESPONSE: Under the draft Federal Facility Agreement, final action decisions for integrator units will be addressed as part of the comprehensive site operable unit (CSOU). The CSOU study will include baseline risk assessments that will evaluate the impacts of any cumulative risks being contributed to the integrator units by sources. The baseline risk assessment for the CSOU will include a human health risk assessment conducted in conjunction with the Ground Water Integrator Unit [i.e., Waste Area Group (WAG) 26] and an ecological risk assessment and human health risk assessment conducted in conjunction with the Surface Water Integrator Units (i.e., WAG 18 and WAG 25) according to the Site Management Plan, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, DOE/OR/07-1207&D3).

National Environmental Policy Act values were incorporated into the WAG 17 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documents, pursuant to DOE's 1994 Secretarial Policy on NEPA and DOE Order 450.1. The Secretarial Policy states that "DOE will hereafter rely on the CERCLA process for review of actions to be taken under CERCLA and will address NEPA values and public involvement procedures as provided...."

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